



## **Social diversity and equity in learning outcomes**

This chapter discusses how academic and socio-economic stratification between schools is related to equity and performance in a school system. It describes how performance varies between schools and how students are sorted across schools depending on their socio-economic status and ability. The chapter examines how the social mix in schools may be related to school-enrolment practices, and compares the degree of social diversity between public and private schools.

When education is “fair”, all children can benefit from the teaching that suits them best. Yet too often, the type of school a child attends depends on his or her family’s resources and conditions rather than his or her specific education needs. A school’s intake at least partially reflects the social mix of the area in which the school is located, and thus residential segregation based on income may result in social homogeneity in schools.<sup>1</sup> Moreover, social segregation across schools may arise from families’ choices, when, for example, only the most informed and educated families choose to opt out of a local school, or if the schools most in demand are allowed to “cream skim” the brightest students or charge high fees (OECD, 2019<sub>[1]</sub>). As academic performance is often related to family background, school systems that favour ability sorting between schools, such as by tracking students into different streams, may also reinforce social stratification between schools.

High levels of social and ability stratification between schools can have an impact on the learning opportunities available to students and thus on education outcomes (Reardon and Owens, 2014<sub>[2]</sub>). The socio-economic composition of a school often determines the availability of certain “resources” that matter for student learning, such as the quality and quantity of teachers (see Chapter 5). Limited social and ethnic diversity in schools implies that disadvantaged students are more likely to be enrolled in schools that have disproportionately large concentrations of low achievers – which also affects their performance. Unless disadvantaged schools are allocated sufficient resources to compensate for their shortfalls, social and academic segregation between schools may thus widen the gaps in outcomes related to socio-economic status.

### What the data tell us

- In PISA 2018, 29% of the OECD average variation in reading performance was observed between schools; the remaining part of the variation was observed within schools. In Baku (Azerbaijan), Canada, Denmark, Finland, Iceland, Ireland, Norway and Portugal between-school differences accounted for less than 15% of the total variation in performance. In Bulgaria, Germany, Israel, Lebanon, the Netherlands and the United Arab Emirates, differences between schools accounted for more than 50% of the total variation in the country’s/economy’s performance.
- Amongst those countries and economies that participated in PISA 2018, the least social diversity within schools was observed in Albania, Argentina, Brazil, Chile, Colombia, Indonesia, Mexico, Peru and the Slovak Republic.
- Disadvantaged students are more or less likely to attend the same schools as high achievers, depending on the school system. In Argentina, Bulgaria, Colombia, the Czech Republic, Hungary, Israel, Luxembourg, Peru, Romania, the Slovak Republic, the United Arab Emirates and Switzerland, a typical disadvantaged student has less than a one-in-eight chance of attending the same school as high achievers (those who score in the top quarter of reading performance in PISA). By contrast, in Baku (Azerbaijan), Canada, Denmark, Estonia, Finland, Iceland, Ireland, Kosovo, Macao (China), Norway, Portugal and Sweden, disadvantaged students have at least a one-in-five chance of having high-achieving schoolmates.

## ACADEMIC STRATIFICATION OF SCHOOLS

PISA results consistently show that in many education systems, average performance measured at the school level varies within and between schools. Academic stratification across schools may arise because of differences in schools’ ability to support their students in their schoolwork. This, in turn, may signal differences in how resources are distributed across schools, or in how productively those resources are used. Variations in performance between schools may also arise because of the way students are allocated to schools. As high-achieving students are more likely to continue to succeed in school, schools that enrol a majority of high achievers are also more likely to obtain good average results without having to exert any particular effort (Deming, 2014<sub>[3]</sub>; Reardon and Raudenbush, 2009<sub>[4]</sub>; Raudenbush and Willms, 1995<sub>[5]</sub>).

Sorting students by ability may be related to system-level features, such as the use of tracking into separate streams, or admissions policies that allow schools to select students based on ability. Comprehensive school systems, i.e. those that do not sort students into programmes or schools based on ability, are expected to show smaller between-school variations in performance (see *PISA 2018 Results [Volume V]: Effective Policies, Successful Schools* (OECD, forthcoming<sub>[6]</sub>), which examines in detail how system- and school-level policies vary and are related to performance differences between students and schools). The systems that try to meet the needs of diverse students by creating different tracks or pathways through education and inviting students to choose amongst them tend to show larger between-school variations, especially if tracking is based on academic performance.

Stratification of schools by ability may also be the result of the way students are allocated to schools based on their prior achievement. Some “elite schools” aim specifically to serve academically gifted students. These include public boarding selective



schools in China (Shi, 2019<sub>[7]</sub>), “exam high schools” in some cities in the United States (Pathak, Angrist and Abdulkadiroglu, 2014<sub>[8]</sub>; Dobbie and Fryer, 2014<sub>[9]</sub>; Abdulkadiroglu et al., 2017<sub>[10]</sub>) and grammar schools in the United Kingdom (Clark, 2010<sub>[11]</sub>). Ability-based allocation may not be limited to the existence of these kinds of schools; it can also result from large-scale school-choice programmes that encourage the allocation of students to schools based on students’ academic record. Such programmes are in place for instance for public secondary schools in Romania (Pop-Eleches and Urquiola, 2013<sub>[12]</sub>) and in Paris, France (Fack, Grenet and He, 2019<sub>[13]</sub>).

The consequences of sorting by ability on performance and equity are difficult to measure (Manski, 1993<sub>[14]</sub>). They are related to the magnitude and direction of “peer effects” at school – the extent to which the performance of one student is affected by that of his or her classmates. The issue of peer effects has been long and hotly debated (for a survey, see Sacerdote, 2011<sub>[15]</sub>). However, over the past two decades, some consensus has emerged on the detriment to a student’s performance of being surrounded by struggling classmates (Burke and Sass, 2013<sub>[16]</sub>; Hanushek et al., 2003<sub>[17]</sub>; Lavy, Silva and Weinhardt, 2012<sub>[18]</sub>; Burke and Sass, 2013<sub>[16]</sub>).<sup>2</sup> Low achievers may require more of the teacher’s attention than other children, especially as struggling students are also more likely to be disruptive (Lavy, Paserman and Schlosser, 2011<sub>[19]</sub>). In turn, this may result in reduced teaching time, or in teachers deciding to adapt their teaching to the needs of the lowest performers – often at the expense of the other students in the class.

In addition, some studies suggest that students who are themselves low achievers may be the most sensitive to the composition of their classes (Mendolia, Paloyo and Walker, 2018<sub>[20]</sub>; Lavy, Silva and Weinhardt, 2012<sub>[18]</sub>; Burke and Sass, 2013<sub>[16]</sub>). By contrast, high-performing students tend to be less affected than their low-achieving peers by the composition of their classes.<sup>3</sup> Stratification by ability may thus widen pre-existing disparities in performance. At the aggregate level, the impact on average performance is unknown, as it will depend on whether high achievers benefit more from attending school with other high achievers than low achievers are harmed by being surrounded with other struggling students (Lavy, Silva and Weinhardt, 2012<sub>[18]</sub>; Sacerdote, 2011<sub>[15]</sub>). In any case, the magnitude of the benefit or detriment to students depends on how the school is organised, including whether disadvantaged schools are allocated more resources, and the teaching practices that are used, notably regarding the ability of teachers to teach heterogeneous classes.

### Between- and within-school variation in performance

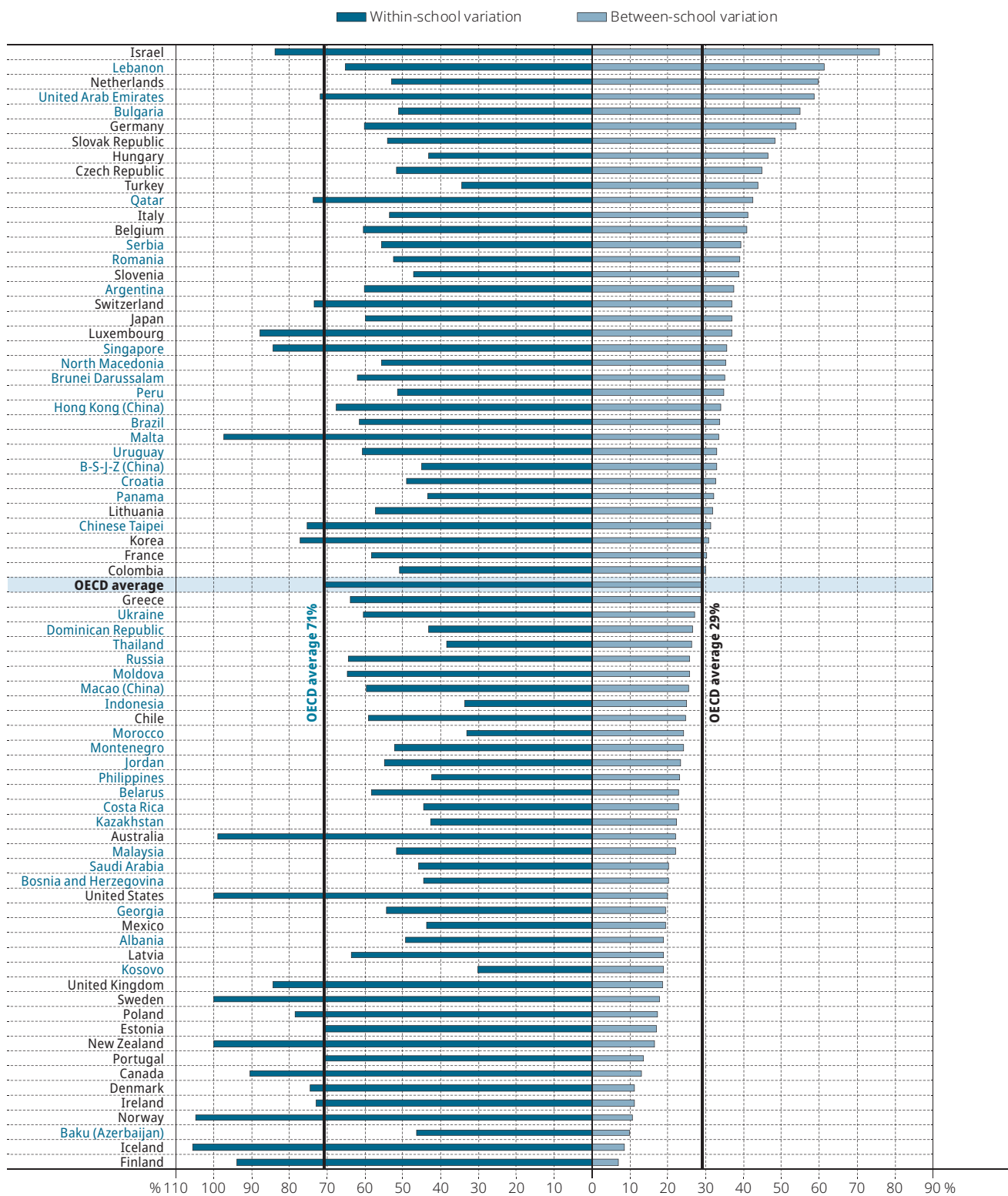
For the sake of comparability between countries, all analyses in this chapter (and in the following chapter) are restricted to schools with the modal ISCED level for 15-year-old students. PISA assesses 15-year-old students enrolled in grade 7 or higher (for details, see Chapter 3 of *PISA 2018 Results [Volume I]: What Students Know and Can Do* (OECD, 2019<sub>[21]</sub>)). This makes cross-country comparisons at the student level more accurate than selecting students in the same grade. Depending on the institutional features of the education system (notably the age at entry into compulsory schooling or pre-primary schooling and grade-retention policies), students in the same grade may have different education histories, making comparisons between school systems unfair.

However, while the students sampled in PISA represent all 15-year-old students, whatever type of school they are enrolled in, they may not be representative of the students enrolled in their school. As a result, comparability at the school level may be compromised. For example, if grade repeaters in a country are enrolled in different schools than students in the modal grade because the modal grade in this country is the first year of upper secondary school (ISCED 3), while grade repeaters are enrolled in lower secondary school (ISCED 2), the average performance of schools where only students who had repeated a grade were assessed may be a poor indicator of the actual average performance of these schools. By restricting the sampling to schools with the modal ISCED level for 15-year-old students, PISA ensures that the characteristics of the students sampled are as close as possible to the profiles of the students attending the school.<sup>4</sup>

In PISA 2018, 29% of the OECD average variation in reading performance was observed between schools (right side of Figure II.4.1); the remaining part of the variation was observed within schools (left side of the figure). The extent of between-school variation in reading performance differed widely across school systems, though. In Canada, Denmark, Finland, Ireland, Norway and Portugal,<sup>5</sup> between-school differences accounted for less than 15% of the total variation in performance, while average reading performance in these countries is higher than the OECD average (Table II.B1.4.1). By contrast, in Bulgaria, Germany, Israel, Lebanon,<sup>6</sup> the Netherlands and the United Arab Emirates, differences between schools accounted for more than 50% of the total variation in the country’s/economy’s performance. In these countries except Germany, the variation in performance was greater than the OECD average, while average performance was lower than the OECD average.<sup>7</sup>

The between-school variation in performance is positively related to the total variation in performance observed at school-system level (Figure II.4.11, available on line). However, the strength of the relationship is weak (the  $R^2 = 0.23$ ). For instance, in Australia, Canada, Finland, Iceland, New Zealand, Norway, Sweden, the United Kingdom and the United States, the level of variation in performance is high compared to the OECD average, while the variation between schools is low.

Figure II.4.1 Variation in reading performance between and within schools



**Note:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3). Countries and economies are ranked in descending order of the between-school variation in reading performance, as a percentage of the total variation in performance across OECD countries.

**Source:** OECD, PISA 2018 Database, Table II.B1.4.1.

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## Isolation indices of high and low achievers

The performance distribution within a country may affect both equity and average achievement at the country level level (for more discussion see OECD, 2019<sub>[11]</sub>); for a discussion, see OECD, 2019<sub>[11]</sub>). A student's performance may be at least partially influenced by that of his or her schoolmates. Schoolmates can motivate each other and help each other overcome learning difficulties; but they can also disrupt instruction, require disproportionate attention from teachers, and be a source of anxiety. However, much recent empirical evidence emphasises that, depending on their own level of ability, some students are more sensitive than others to the composition of their classes (Mendolia, Paloyo and Walker, 2018<sub>[20]</sub>; Lavy, Silva and Weinhardt, 2012<sub>[18]</sub>; Burke and Sass, 2013<sub>[16]</sub>). Measuring the concentration of high and low performers in a school thus provides a more accurate and informative indication of the degree of stratification between schools.

Isolation indices provide an indication of whether school systems create “clusters” of students based on their academic performance (see Box II.4.1). Higher values in the indices mean that low achievers are more often isolated in certain schools with students of similar ability; lower values in the indices correspond to a more varied distribution of student abilities within schools. From these indices, one may calculate the opportunities available for a student from one particular group to interact at school with students who do not belong to the same group (see Annex A3 for a more complete description). For instance, a value of 0.30 in the isolation index of low achievers means that a student who scores in the bottom quarter of the distribution of PISA performance within a country has around one-in-two chance of attending the same school as students who are also low achievers, while this likelihood would have been only one in four if students had been uniformly distributed across schools.<sup>8</sup> Similarly, the isolation index of high achievers measures the concentration in certain schools of those students who score in the top quarter of the distribution of PISA performance in their country, i.e. whether these students are isolated in certain schools with other high-performing students (high values in the index) or are more often “mixed” with students of lower ability (low values in the index).

### Box II.4.1. The isolation index: An illustration

There are a variety of ways to measure residential or school segregation; for a review, see, for instance (Frankel and Volij, 2011<sub>[22]</sub>). A first family of measures focuses on the interactions between groups of students. The “isolation index” used in this chapter is related to the probability that an average student from group A will be in contact at school with members of group B (see Annex A3 for details on computation). This index ranges from 0 (no segregation) to 1 (full segregation).

The following schemas provides an illustration, in very simplified cases.

Figure II.4.2 Complete vs no segregation cases (illustrative example 1)

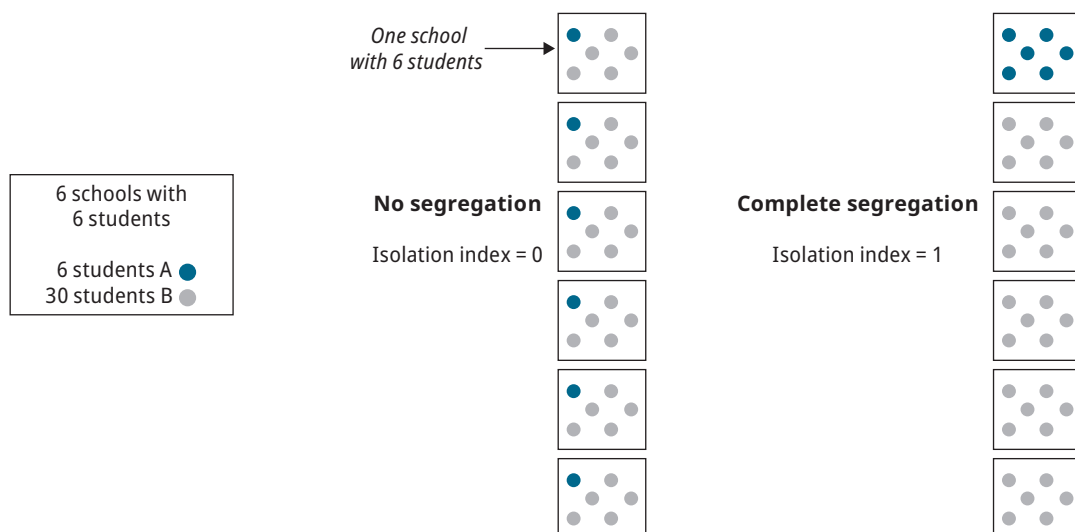
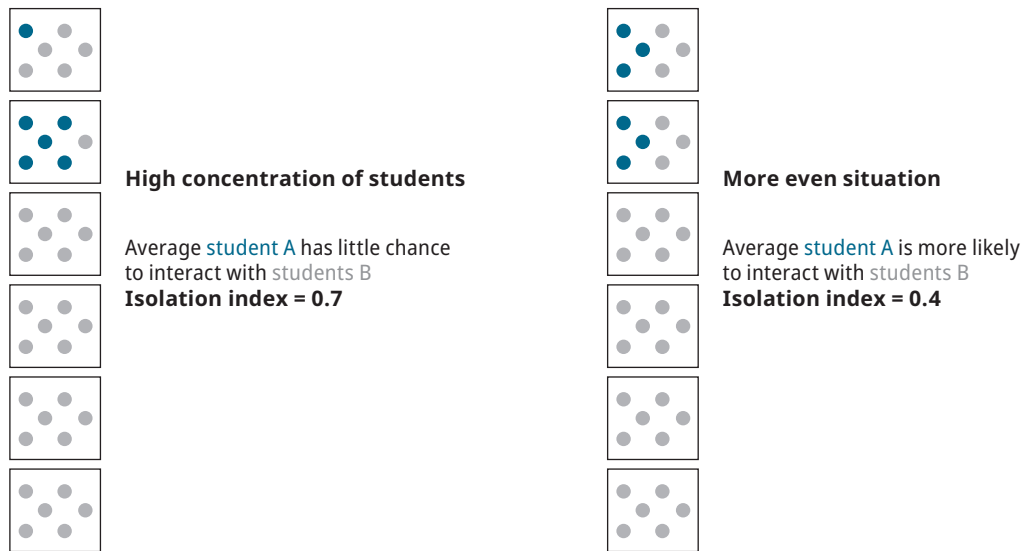


Figure II.4.3 Complete vs no segregation cases (illustrative example 2)



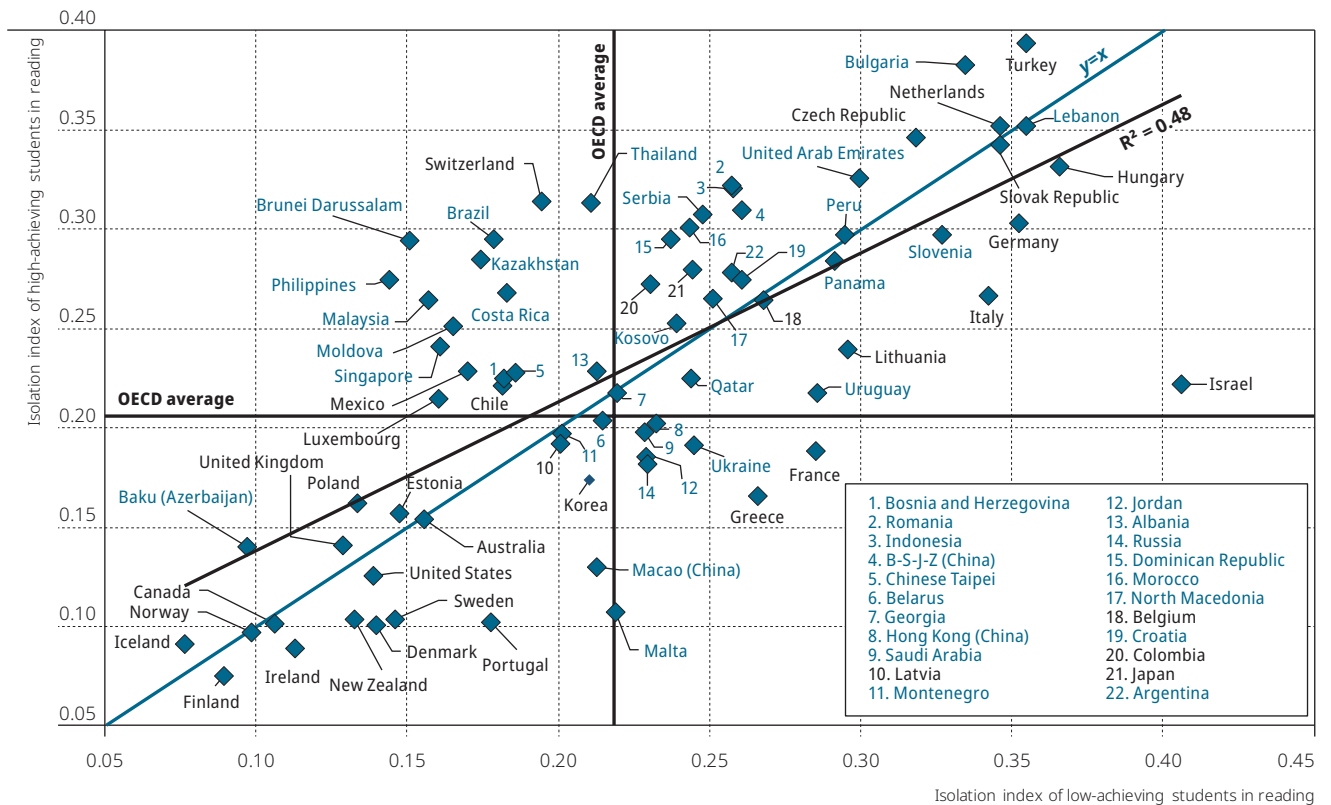
One may also calculate a version of the isolation index using two categories that do not constitute a division of the population – for example, when measuring disadvantaged students’ exposure to high achievers in the country. In this case, the two groups taken together may not constitute the entire population, and in this example may partially overlap, as some disadvantaged students may be also high achievers. The lowest value (0) is observed when the two subgroups are clustered in the same schools; the highest value (1) is observed when they are both clustered but in different schools. Medium values (0.5) are observed when the two populations are randomly mixed within the schools.

Isolation indices are adequate when one singles out one group of students (for instance, disadvantaged students) from all other students (for instance, all non-disadvantaged students, including advantaged students and those of average socio-economic status). The no social diversity index (see Annex A3 for a description), referred to as the “mutual information index” or the “entropy index” (Frankel and Volij, 2011<sup>[22]</sup>; Reardon and Firebaugh, 2002<sup>[23]</sup>), may be measured using a partition related to the four quarters of the national distribution of socio-economic status. The no social diversity index goes from 0 (no segregation) to 1 (full segregation). Unlike the isolation index, it is additively decomposable, for example, depending on the type of school (public or private).

In 2018, the indices of isolation of low and high achievers were strongly correlated, as expected. Higher concentrations of both low- and high-achieving students in distinct schools were observed in Bulgaria, the Czech Republic, Germany, Hungary, Lebanon, the Netherlands, the Slovak Republic, Slovenia, Turkey and the United Arab Emirates, where both indices were greater than 0.30 (Figure II.4.4). This means that in these countries low achievers are concentrated in some schools and high achievers are concentrated in others. This may be the result of variations in school efficiency: some schools succeed in helping all their students achieve at high levels, while others have little or no impact on students’ performance. Such variability in efficiency may be due to differences in the allocation of resources to schools (see Chapter 5); it may also result from policies that allocate students to schools based on students’ abilities. By contrast, the values in both indices were lower than 0.15 in Baku (Azerbaijan), Canada, Denmark, Finland, Iceland, Ireland, New Zealand, Norway, Sweden, the United Kingdom and the United States. In these countries/economies, students of varying ability were likely to attend the same school.

The degrees of isolation of high and low achievers did not always coincide, though. For instance, in Brazil,<sup>9</sup> Brunei Darussalam, Kazakhstan, Malaysia, the Philippines, Switzerland and Thailand the concentration of high-performing students in some schools was much greater than the concentration of low achievers in certain schools. This kind of academic segregation “at the top” may be the result of explicit tracking of the best students into some “elite schools”, based on their previous academic record; see, for instance, Pathak, Angrist and Abdulkadiroglu, 2014<sup>[8]</sup>; Dobbie and Fryer, 2014<sup>[9]</sup>; Abdulkadiroglu et al., 2017<sup>[10]</sup>; Shi, 2019<sup>[7]</sup>; Clark, 2010<sup>[11]</sup>. In almost all of these countries/economies, more than one in three students were in schools whose principal reported that “a student’s record of academic performance, including placement tests, are always used for admission” (Table II.B1.4.3).

Figure II.4.4 Isolation index of low- and high-achieving students in reading



**Notes:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).

The isolation index measures whether students of type A are more concentrated in some schools. The index is related to the likelihood of a representative type A student to be enrolled in schools that enrol students of another type. It ranges from 0 to 1, with 0 corresponding to no segregation and 1 to full segregation (see Annex A3 for a more complete description).

Low-achieving students are students who scored amongst the bottom 25% of students within their country or economy on the PISA test.

High-achieving students are students who scored amongst the top 25% of students within their country or economy on the PISA test.

**Source:** OECD, PISA 2018 Database, Table II.B1.4.2.

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By contrast, in France, Greece, Israel and Malta, the concentration of low achievers in a limited set of schools was much greater than that of high achievers.<sup>10</sup> In France, more than 15% of students were enrolled in vocational education (Table II.B1.4.4) and the observed performance of students in vocational education appeared to be much lower than that of students in general or modular education (by 110 score points; see Table II.B1.4.5). These two observations combined may explain why higher concentrations of low performers were observed in some schools.

## SOCIAL SEGREGATION ACROSS SCHOOLS

### Between- and within-school variations

How the variation in performance is distributed between and within schools is often related to the degree of socio-economic diversity across schools. On average across OECD countries in 2018, 76% of the variation in the PISA index of economic, social and cultural status of students in the modal grade for 15-year-olds was observed within schools, as indicated by the value in the index of social inclusion. The remainder of the variation in students' socio-economic status was observed between schools (Table II.B1.4.6). This implies that, on average, one may observe more socio-economic diversity amongst students who attend the same schools than amongst students attending different schools.

As discussed above, academic segregation may be the result of differences in schools' efficiency, or of the deliberate policy of streaming, either into different tracks of education, such as vocational or academic, or into "elite schools". In the latter case, social segregation is often a by-product of these policies. Social segregation across schools may reflect academic segregation, given that achievement and socio-economic status are positively related in all countries and economies.

Socio-economic segregation may also be related to contextual factors, such as residential segregation. The social composition of a school partially reflects that of the area in which the school is located. In countries where families of different socio-economic

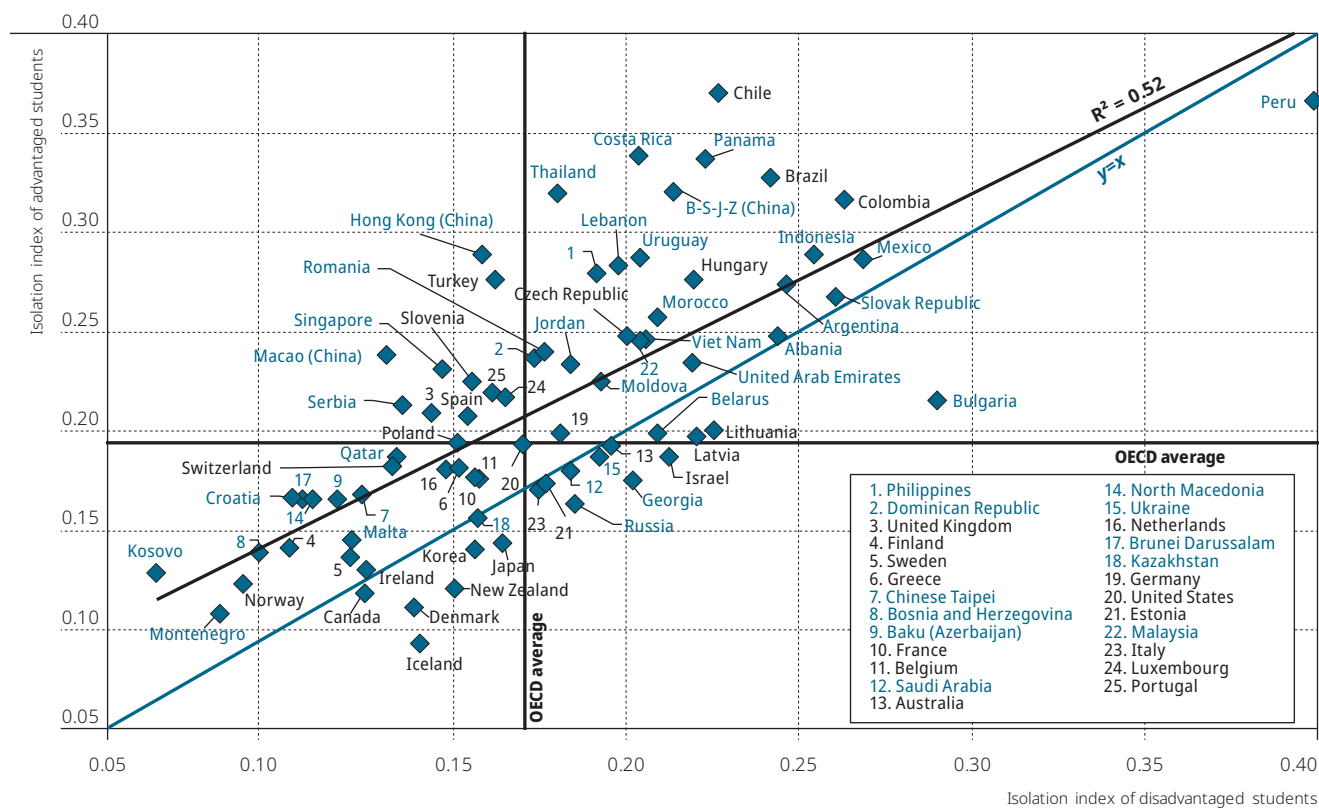
status live in separate neighbourhoods, students are likely to attend school with peers of similar socio-economic status. Socio-economic segregation may also be amplified, or mitigated, by the freedom given to families to attend a school other than the one in their neighbourhood (OECD, 2019<sub>[1]</sub>).

### Isolation indices of disadvantaged and advantaged students

As with academic segregation, one may analyse whether social segregation between schools is better explained “at the bottom”, by the concentration of disadvantaged students in some schools, or “at the top”, by the concentration of advantaged students in some schools. This can be done using isolation indices of disadvantaged and advantaged students, respectively. Higher values in the indices mean that students are more often isolated in certain schools, based on their socio-economic status.

In 58 of the 79 countries and economies that participated in PISA 2018, advantaged students were less likely, on average, to attend the same schools as average or disadvantaged students than disadvantaged students were likely to attend the same school as more advantaged students. In other words, the isolation index of advantaged students was higher than the isolation index of disadvantaged students (Figure II.4.5). This situation was especially marked in Beijing, Shanghai, Jiangsu and Zhejiang (China) (hereafter “B-S-J-Z [China]”), Chile, Costa Rica, Hong Kong (China), Macao (China), Panama, Thailand and Turkey. High concentrations of advantaged students in some schools may result if, for instance, some private schools charge high tuition fees, thereby discouraging all but the most affluent families from enrolling their children in these schools.

Figure II.4.5 Isolation index of advantaged and disadvantaged students



**Notes:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).

The isolation index measures whether students of type A are more concentrated in some schools. The index is related to the likelihood of a representative type A student to be enrolled in schools that enrol students of another type. It ranges from 0 to 1, with 0 corresponding to no segregation and 1 to full segregation (see Annex A3 for a more complete description).

A socio-economically advantaged student is a student in the top quarter of the PISA index of economic, social and cultural status (ESCS) in his or her own country/economy.

A socio-economically disadvantaged student is a student in the bottom quarter of the PISA index of economic, social and cultural status (ESCS) in his or her own country/economy.

**Source:** OECD, PISA 2018 Database, Table II.B1.4.7.

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In B-S-J-Z (China), Costa Rica, Montenegro, Norway and Thailand, both advantaged and disadvantaged students were much less isolated than the OECD average. By contrast, in Peru both indices were much higher than the OECD average. This situation may result from both a prevalence of private schooling in the country and a high degree of residential segregation.

Social segregation across schools deprives children of opportunities to interact with children from different social, cultural and ethnic backgrounds, thus threatening social cohesion.<sup>11</sup> It can also widen inequities in education (OECD, 2019<sub>[1]</sub>). When socio-economic segregation between schools is high, disadvantaged students are more at risk of being “left behind” in schools with high concentrations of low performers – which may affect their own academic performance. Achievement may suffer if a student’s classmates include a large proportion of low-achieving peers (Mendolia, Paloyo and Walker, 2018<sub>[20]</sub>; Lavy, Silva and Weinhardt, 2012<sub>[18]</sub>; Hanushek et al., 2003<sub>[17]</sub>; Burke and Sass, 2013<sub>[16]</sub>; Sacerdote, 2011<sub>[15]</sub>). When students from disadvantaged families attend schools that concentrate disadvantage, they are more likely to perform poorly in school.

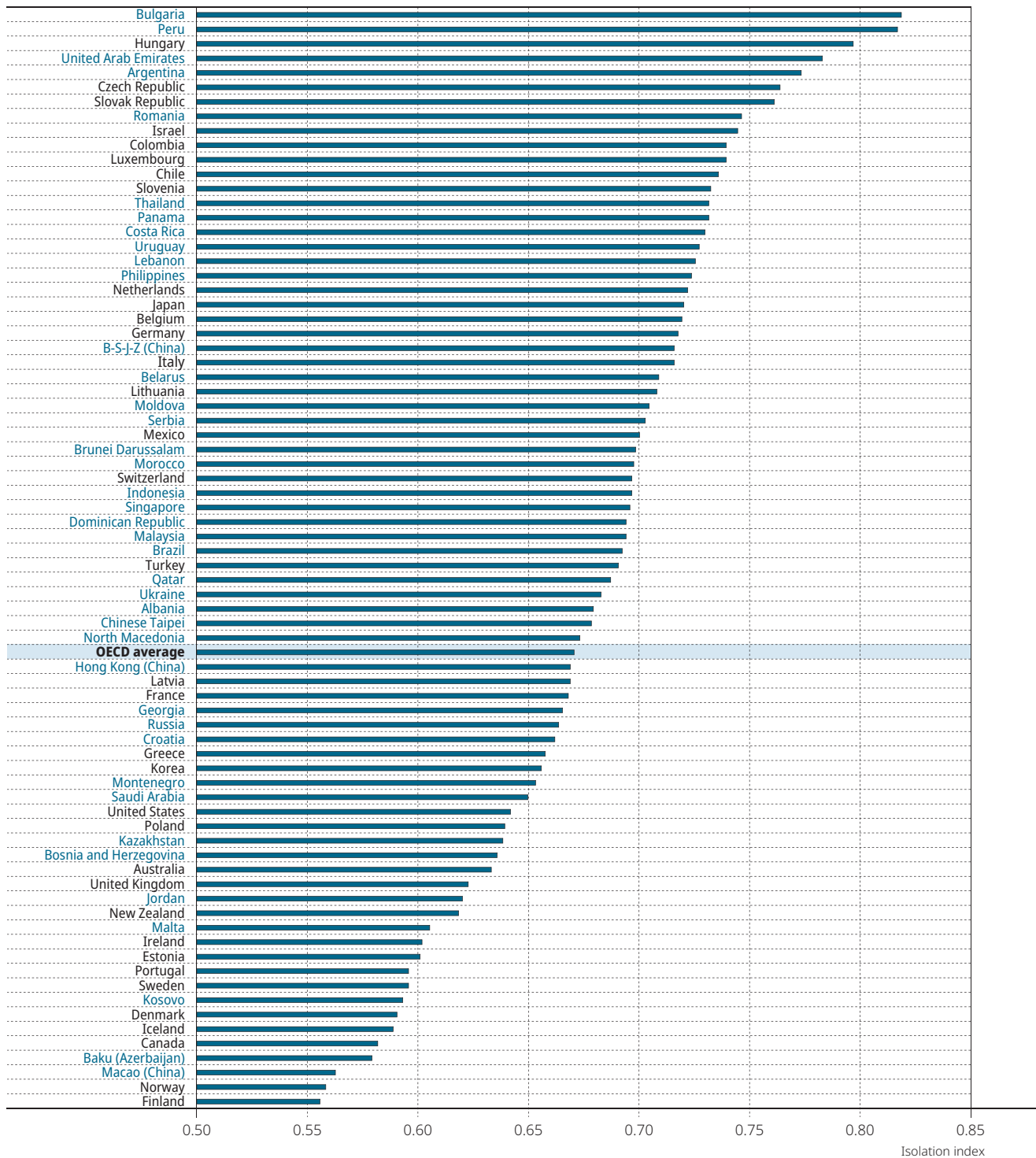
Social segregation may also have consequences for the extent to which disadvantaged students are exposed to students who are high achievers in PISA (defined as students who score in the top quartile of performance). An index was created to measure the extent to which a typical disadvantaged student in a country/economy is unlikely to be in a school that enrolls high-achieving students. The index has a value close to 1 when disadvantaged students are clustered in schools that do not enrol high-achieving students; it has lower values when disadvantaged students and high achievers are spread relatively evenly across schools (for more details, see Annex A3).

### **Index of isolation of disadvantaged students from high achievers**

There are large disparities across countries and economies in the isolation of disadvantaged students from high-achieving students (Figure II.4.6). On average across OECD countries, the index value was 0.67. This means that a typical disadvantaged student has a one-in-six chance of being enrolled in the same school as high achievers, while this likelihood would be one in four if both populations had been randomly mixed in the schools.<sup>12</sup> But in Argentina, Bulgaria, the Czech Republic, Hungary, Peru, the Slovak Republic and the United Arab Emirates, the index was higher than 0.75, meaning that disadvantaged students were more often concentrated in schools with a small proportion of high achievers (the probability that a typical disadvantaged student was enrolled in the same school as high achievers was less than one in eight). By contrast, in Baku (Azerbaijan), Canada, Denmark, Estonia, Finland, Iceland, Kosovo,<sup>13</sup> Macao (China), Norway, Portugal and Sweden, the index was at or below 0.60, meaning that disadvantaged students were comparatively more likely to be enrolled in schools with high achievers.

The index of isolation of disadvantaged students from high achievers is also expected to be lower in school systems where socio-economic status is weakly associated with performance and where disadvantaged students are more likely to overcome the odds against them and perform well at school. In countries and economies where the percentage of “resilient students” (see Chapter 3) is high, the index of isolation of disadvantaged students from high achievers may thus be lower than in countries with a similar level of concentration of disadvantaged students in schools. This is especially the case when admission to school is based on proven ability, as resilient disadvantaged students are more likely to be enrolled in “good” schools. As discussed in Chapter 3, on average across OECD countries, around one in ten disadvantaged students scored in the top quarter of the performance distribution in their own country/economy in PISA 2018.

Figure II.4.6 Isolation of disadvantaged students from high-achieving students in reading



**Notes:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).

The isolation index of disadvantaged students from high-achieving students measures whether socio-economically disadvantaged students are concentrated in schools distinct from those that enrol high-achieving students. The index is related to the likelihood that a representative disadvantaged student attends a school that enrolls high-achieving students. It ranges from 0 to 1, with 0 corresponding to no segregation and 1 to full segregation (see Annex A3 for a more complete description).

A socio-economically disadvantaged student is a student in the bottom quarter of the PISA index of economic, social and cultural status (ESCS) in his or her own country/economy.

High-achieving students are students who scored amongst the top 25% of students within their country or economy on the PISA test.

Countries and economies are ranked in descending order of the isolation of disadvantaged students from high-achieving students in reading.

**Source:** OECD, PISA 2018 Database, Table II.B1.4.8.

**StatLink** <https://doi.org/10.1787/888934037412>



## HOW SCHOOL CHOICE AND PRIVATE SCHOOLING ARE RELATED TO SOCIAL SEGREGATION

The degree of social and academic diversity in schools depends on how students are allocated across schools. In almost all school systems, students are assigned to public schools based, at least partly, on their home address. Through this policy, students are typically allocated to the school closest to their home, usually to avoid long and possibly costly commutes. Only in a very limited number of countries/economies that participated in PISA 2018 – namely Argentina, Bulgaria, Belgium (Fr.), Chile, Ireland, Italy, Lebanon, Macao (China), the Netherlands, Peru and Singapore – did system-level education authorities report that the “initial assignment to public schools is *not* based on geographical area” for lower secondary schools (Table II.B1.4.9). This does not imply that, in other countries and economies, school admissions were strictly based on where the student lives. For instance, in some countries the modal grade for 15-year-olds corresponds to upper secondary school, which often do not use residence as a criterion for admission (OECD, 2019<sup>[11]</sup>). Even when residence is a criterion, the extent to which it is applied locally may vary from one place to another.

On average across OECD countries in 2018, two in five students were enrolled in a modal grade school whose principal reported that residence in a particular area is always used as a criterion for enrolment (Table II.B1.4.3). This criterion was used much less often in private schools. On average across OECD countries, almost one in two students was enrolled in a modal grade public school that always uses the residence-based criterion, while only one in ten students attended a modal grade private school that always uses that criterion.

### Box II.4.2. Public schools, and government-dependent and independent privately managed schools

Public schools, as defined in PISA, are those managed by a public education authority, government agency, or governing board appointed by a government or elected by public franchise. Private schools refer to schools managed directly or indirectly by a non-governmental organisation, such as a church, trade union, business or other private institution. Privately managed schools are classified as independent when at least 50% of the funding comes from private sources; they are classified as government-dependent when at least 50% of the funding comes from the government (including departments and local, regional, state and national government).

PISA classifies school type based on the principal's report. In some instances, the principal may consider a privately managed school public if the funding comes mainly from the government. For instance, charter schools in the United States, which are publicly funded schools that operate independently of the state-run system and should be defined as government-dependent private schools in PISA, are commonly defined as public schools.

Government-dependent private schools are usually required to comply with government regulations to a greater extent than independent private schools. Nevertheless, conditions under which private providers are eligible for public funding vary considerably across OECD countries. In some countries, publicly funded private schools do not only enjoy greater pedagogical freedom than their publicly managed counterparts, they also have greater autonomy in their admissions and tuition policies.

Some systems impose strict eligibility criteria on private schools that seek to qualify for public funding. For instance, education authorities may oblige these schools to follow national curricula and assessment procedures, prohibit for-profit operators or restrict the ability of these schools to charge add-on fees and engage in selective admissions (Boeskens, 2016<sup>[24]</sup>). In Belgium, for example, subsidised private schools are not permitted to select students on the basis of their academic achievement, in order to guarantee parents' right to exercise free school choice. In the Netherlands, government-dependent private schools need to comply with the same regulations governing school admissions and tuition fees as public schools. The situation in the United Kingdom is similar, as private dependent schools (mainly academies or free schools) are more like public schools when it comes to funding than private independent schools. Other systems use targeted-funding schemes designed exclusively to benefit or provide additional support to disadvantaged students in private schools (Musset, 2012<sup>[25]</sup>).

While it is relatively common for oversubscribed public schools to take into account non-academic factors, such as the proximity of a student's home or a sibling's enrolment in the school, in some countries publicly funded private schools are permitted to select students on the basis of academic achievement, aptitude tests and parent interviews (see also Bergman and McFarlin, 2018<sup>[26]</sup>). These differential selection practices can restrict the exercise of school choice and risk increasing student segregation across schools.

**Source:** OECD (2017), *The Funding of School Education: Connecting Resources and Learning*, OECD Reviews of School Resources, OECD Publishing, Paris, <https://doi.org/10.1787/9789264276147-en>; Boeskens (2016), *Regulating Publicly Funded Private Schools: A Literature Review on Equity and Effectiveness*, <https://dx.doi.org/10.1787/5jln6jcg80r4-en>; Musset, P. (2012), *School Choice and Equity: Current Policies in OECD Countries and a Literature Review*, <https://dx.doi.org/10.1787/5k9fq23507vc-en>; Bergman et McFarlin (2018), <https://doi.org/110.3386/w25396>

Large differences in enrolment policies, particularly across public schools, were observed. For instance, in Brunei Darussalam, Finland, France, Greece, Malta, Poland, Qatar and Switzerland, amongst students enrolled in public schools, at least three in four were enrolled in a school that relies on residence-based assignment. By contrast, in Bosnia and Herzegovina, Croatia, Kosovo, Macao (China), Mexico, the Republic of North Macedonia (hereafter “North Macedonia”), Serbia, Singapore, Slovenia and Romania, fewer than one in ten students were enrolled in a school according to this criterion.<sup>14</sup> This proportion was usually larger in private dependent schools than in private independent schools. However, whatever the type of private school considered, amongst those students enrolled in private schools, the proportion of students in a school whose principal reported that the school always bases admissions on residence was never higher than 60%. The largest proportions of students in private schools that use residence as a criterion for admissions were observed in Indonesia, Spain and, for government-dependent schools, the United Kingdom. But in almost all countries and economies, the share of students enrolled in a school that uses residence-based criteria for admissions was at least 15 percentage points larger when restricting the sample to students enrolled in public schools than when restricted to students in private schools.

### The aims and effects of school choice

Over the past few decades, many countries have implemented reforms that provide more school options to families (Musset, 2012<sub>[25]</sub>; OECD, 2019<sub>[11]</sub>). These programmes may have several distinct objectives. Promoting competition between schools is seen as a way to stimulate innovation and foster efficiency. School choice may also respond to parents’ demand for access to more diverse pedagogical offerings in order to select the school that best suits their child’s learning needs. Offering a choice of schools may also be a way of reducing school segregation. Strict geographic assignment may have the unintended consequence of reproducing, and even reinforcing, patterns of residential segregation. Socio-economically disadvantaged students may get “stuck” in low-quality schools because their families cannot afford to live close to the highest-quality schools.

Promoting school choice may be accomplished in several ways. In 37 of the 50 countries and economies that provided system-level information on school choice in 2018, public authorities affirmed families’ right to enrol in another public school apart from the one geographically closest to them (Table II.B1.4.9). In addition, governments may give families a tuition certificate that can be used to pay tuition at any “approved” school (which could be private or public, depending on the programme). For instance, in 24 countries and economies, school vouchers (also referred to as scholarships) were available to students enrolled in schools (in 15 countries/economies, the vouchers could be used for admission to public schools; in 19 countries/economies, they could be used for admission to private schools). In 14 countries/economies, tuition tax credits were available to help families offset the costs of private schooling (in 9 of them, for students enrolled in private independent schools; in 4 others, for students enrolled in private dependent schools).

Weakening the link between school assignment and home address could give parents more freedom to choose their child’s school; it could also have a significant impact on the social composition of schools. On the one hand, disadvantaged students may be able to enrol in schools with a more affluent intake than their “neighbourhood” school. On the other hand, previous evidence has shown that it is often the most highly educated and well-off parents who take advantage of these programmes because they have more or better resources to identify and select the highest-quality schools, or because of the complexity of the admissions and enrolment procedures in these schools. Financial considerations (school fees, transportation costs or time constraints) may limit the options available to some students from low-income families. Even where vouchers or similar programmes reduce the cost of publicly funded private schools, top-up fees or “hidden” parental contributions (for extracurricular activities, school uniforms, etc.) might make these schools unaffordable in practice (Boeskens, 2016<sub>[24]</sub>). If these latter mechanisms prevail, school-choice programmes may exacerbate, rather than mitigate, socio-economic segregation between schools.

Social segregation across public schools may be due to residential segregation, when home address is primarily used for enrolment, but also when parents are given more options and schools compete to attract the best students. Private schooling may exacerbate socio-economic segregation within the school system, for instance, if only high-income families can afford private school. In addition, private schools, especially those that are independently funded and managed, may offer certain educational resources that may be attractive to some families and not others; this can also result in stratification.

### The no social diversity index

The contribution of private schooling to the overall degree of social segregation within a country is expected to vary with the size of private school sector. This can be measured through the no social diversity index. The index measures the extent to which social diversity, as observed at the country level, is mirrored at the school level. It ranges from 0, which corresponds to an even distribution of students across schools, regardless of their socio-economic status, to 1, which would be observed if schools in a country never enrolled students of diverse socio-economic status.

Amongst those countries and economies that participated in PISA 2018, the highest levels of social segregation according to this indicator (i.e. the lowest degree of social diversity within schools) were observed in Albania, Argentina, Brazil, Chile, Colombia,



Indonesia, Mexico, Peru and the Slovak Republic (Table II.B1.4.10). In these countries/economies, the no social diversity index was at least 0.20 – twice as high as the level of segregation that prevails in Brunei Darussalam, Canada, Croatia, Finland, Ireland, Korea,<sup>15</sup> Malta, North Macedonia, Norway, Sweden and Chinese Taipei, for instance.

The no social diversity index can be decomposed into three distinct components: the social segregation observed between public and private schools; the social segregation across public schools, weighted by the share of students in public schools; and the social segregation across private schools, weighted by the share of students in private schools. In this analysis, government-dependent and independent private schools were analysed jointly, as in many countries the number of students/schools in the private government-dependent or private independent categories was insufficient to be used for the estimates.<sup>16</sup>

The first component measures the extent to which the social composition of private schools, as a whole, differs from the social composition of public schools, as a whole. The difference is expected to be sizeable if, for example, private schools tend to select more affluent students because of tuition fees. In a few countries, the difference between public and private schools in their social composition had a substantial impact on the level of social diversity within schools at the aggregated level (see Figure II.4.7). For instance, in Argentina, Brazil, Brunei Darussalam, Colombia, Costa Rica, the Dominican Republic, Malta, Panama, Peru, the Philippines and Uruguay, this difference, which is greater than the OECD average, accounts for more than a quarter of the overall level of segregation. In the majority of countries and economies, however, this difference does not account for more than 10% of the degree of social segregation across schools. In these cases, the level of social segregation depends not only on the difference in social composition between private and public schools, but also on the social sorting that may occur across public or private schools.

In general, social segregation is greater across private schools than public schools (see online Figure II.4.12). But after taking into account the respective weights of the private and public school sectors within a country/economy, the segregation observed across private schools does not contribute much to the overall level of segregation in the country/economy. Since most students in most countries were enrolled in public schools in 2018, the contribution of public schools to overall segregation was usually greater (see Figure II.4.7) than that of private schools (see Figure II.4.7). On average across OECD countries, social segregation across public schools, weighted by the proportion of students enrolled in public schools, accounted for two-thirds of overall social segregation, as measured by the no social diversity index. The exceptions are countries/economies where the share of private schools was particularly large, such as Chile, Hong Kong (China), Lebanon, Macao (China), the Netherlands, the United Arab Emirates and the United Kingdom, where segregation across private schools accounted for more than half of the overall level of segregation.

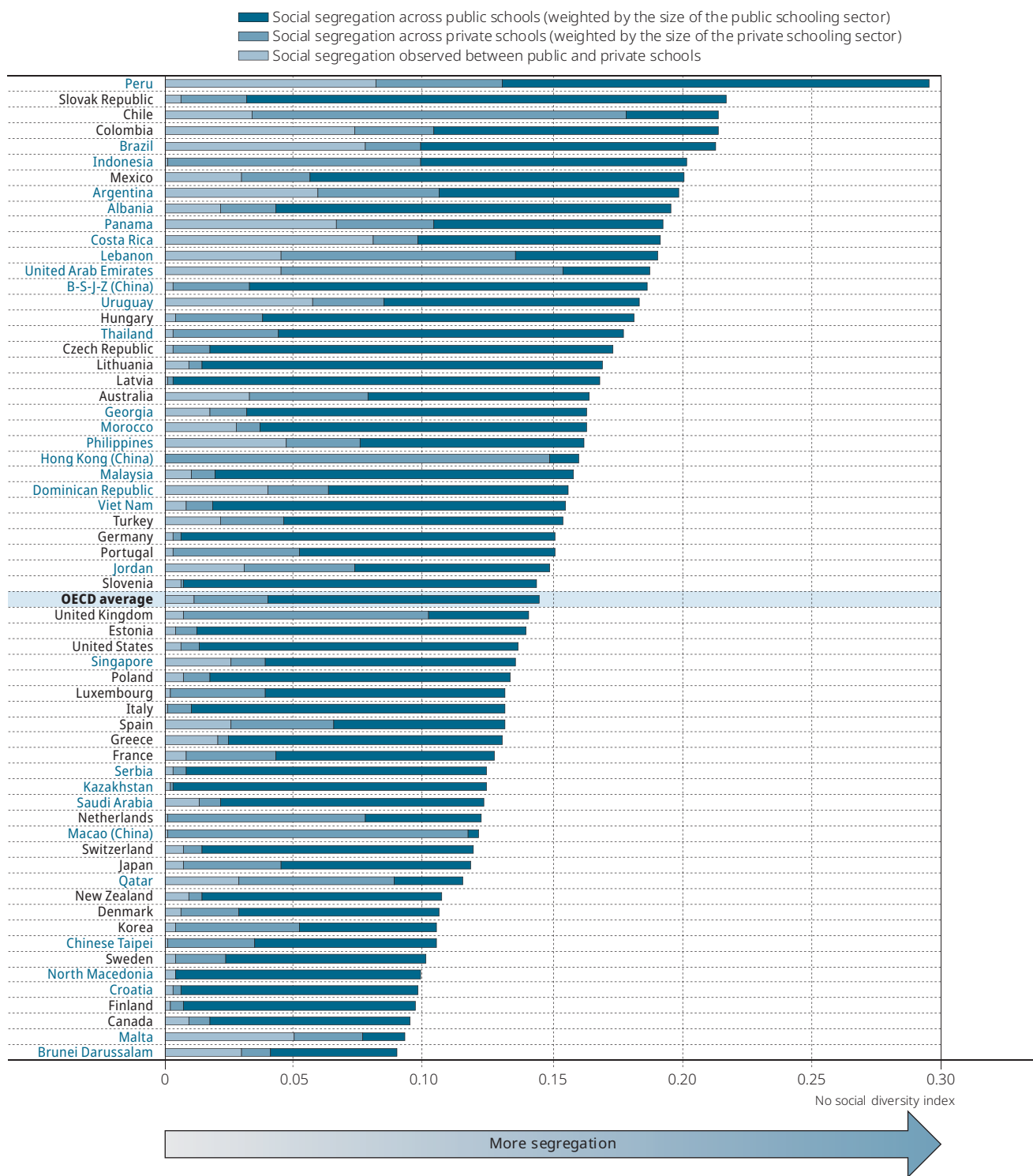
Segregation within the public or private sector may reflect the relationship between grade repetition and streaming into different education tracks, on the one hand, and students' socio-economic status, on the other. Competition between schools within the same sector, i.e. public or private, may also result in segregation across schools. For instance, schools may choose to limit their offerings to specific conditions (such as providing remedial education for low achievers who struggle in the traditional school system, or proposing a programme for "gifted" children). Even in the absence of competition, enrolment is expected to reflect residential segregation, and this may be reinforced over time, as parents' decisions about where to live are partly based on the profile of the schools – and the schools' student population – that are available to them. In 16 countries that participated in PISA 2018, Chile, Costa Rica, Italy, Jordan, Lebanon, Luxembourg, Macao (China), Malta, Norway, Panama, the Philippines, Poland, Portugal, Qatar, the United Arab Emirates and Uruguay, the index of no social diversity across private schools was twice as large as that across public schools (Table II.B1.4.11).<sup>17</sup>

In some countries, private schools are expected to offer a more differentiated education (for instance, distinct curriculum or pedagogical practices) than public education does – and thus may attract different types of students. This is especially true when families are offered financial support – either directly or indirectly through public funding to schools – to send their child to a private school. The private schools where middle- or even low-income students enrol may not be the same as those where the most advantaged students are enrolled. For instance, recent evidence from a US school voucher plan suggests that in some cases, when disadvantaged families are offered financial support to send their child to a private school, they may choose low-quality private schools. This results in poorer performance amongst the disadvantaged children who "benefitted" from the programme (Abdulkadiroğlu, Pathak and Walters, 2018<sup>[27]</sup>).

Greater social segregation across private schools may be related to the use of selective admissions. On average across OECD countries, amongst 15-year-old students enrolled in private schools, half attended a school whose principal reported that "a student's record of academic performance, including placement tests, are always used for admission"; the proportion of students in public schools whose principal so reported is 20 percentage points smaller (Figure II.4.8). In 35 of the 79 countries and economies that participated in PISA 2018, private schools were significantly more selective than public schools. In 26 of those countries and economies, more than 3 in 4 students in private school attended a school whose principal reported that the school always uses performance-based criteria for enrolment.

Figure II.4.7 Public and private schools, and social segregation across schools

Decomposition of the no social diversity index based on the contributions of public and private schools



**Notes:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3). The no social diversity index measures whether the diversity of students observed within schools reflects the diversity of students observed at the country/economy level. The index ranges from 0 to 1, with 0 corresponding to no segregation and 1 to full segregation (see Annex A3 for a more complete description).

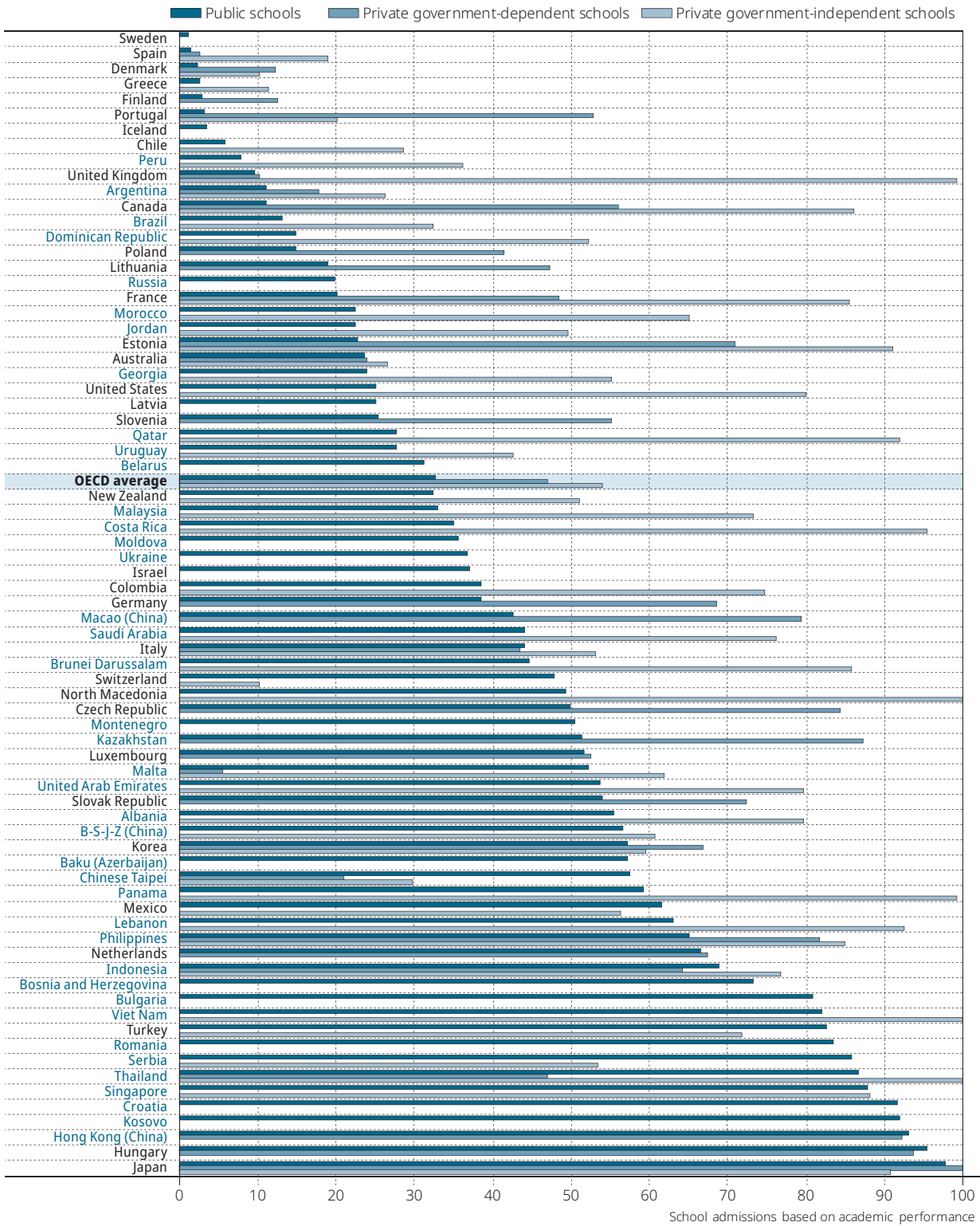
Countries and economies are ranked in descending order of the overall level of segregation.

Source: OECD, PISA 2018 Database, Table II.B1.4.10.

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Figure II.4.8 **School selectivity, by school type**

Percentage of students in schools whose principal reported that academic performance (including placement tests) is “always” considered for admission to school



**Note:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).

Countries and economies are ranked in ascending order of the social segregation in public schools.

**Source:** OECD, PISA 2018 Database, Table II.B1.4.3.

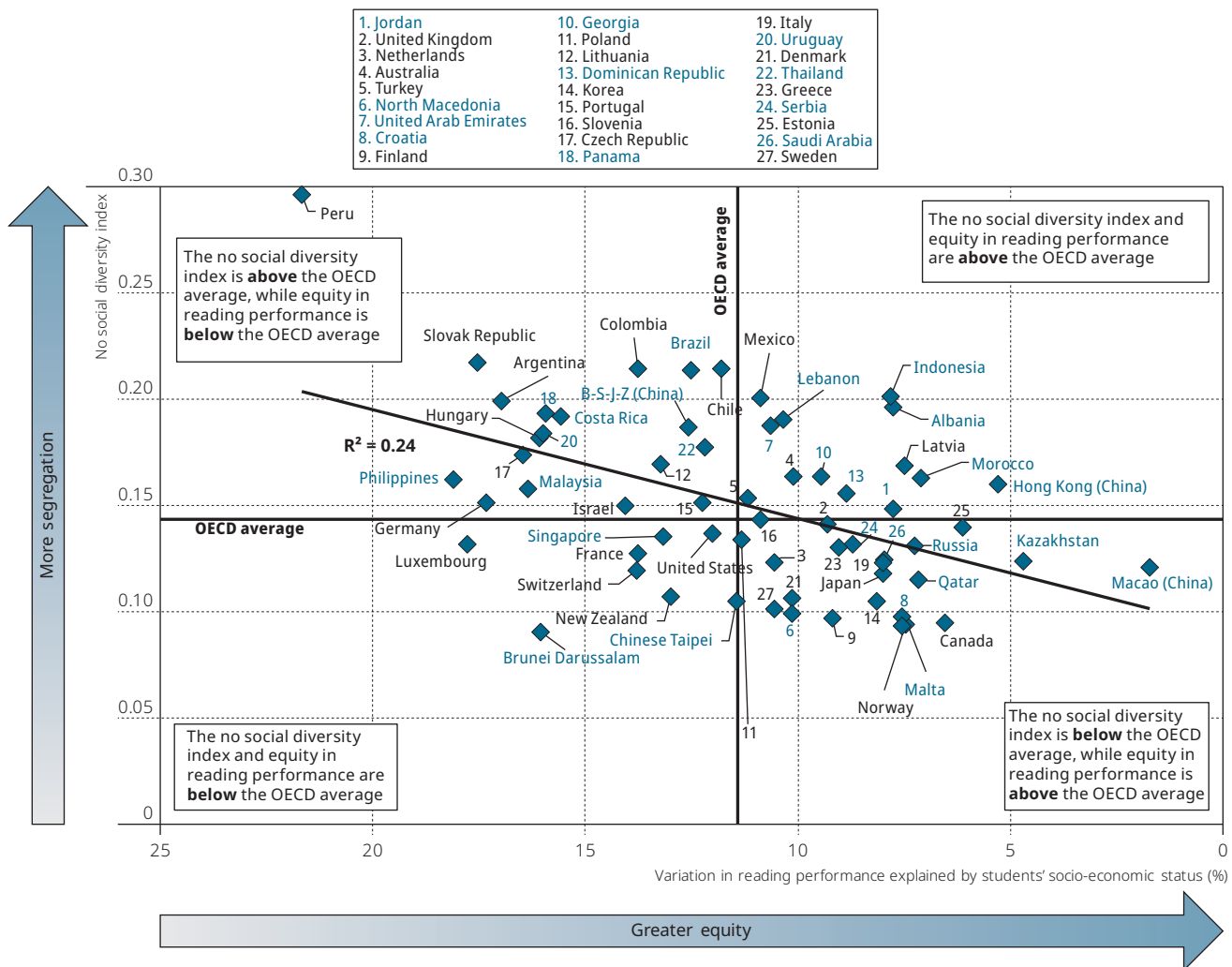
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## SOCIAL SEGREGATION AND EQUITY IN EDUCATION

A high degree of social segregation across schools means that children are less likely to communicate with peers from diverse backgrounds, and this may undermine future social cohesion. As discussed above, students, especially those from disadvantaged families, may be harmed by a lack of social and academic diversity in schools, which, in turn, renders equity in education elusive. When disadvantaged students are clustered in a limited number of schools, these students tend to be exposed to less-favourable learning conditions. As discussed in detail in Chapter 5, disadvantaged schools often lack adequate educational material, and qualified and experienced teachers. As disadvantaged students are often over-represented amongst low achievers, schools that concentrate a large proportion of disadvantaged students generally also have high concentrations of struggling students, and this may have additional detrimental effects on academic achievement.

Social segregation is thus likely to reinforce the link between socio-economic disadvantage and poor academic achievement. The PISA-participating countries/economies where schools were less socially diverse also tended to have the strongest relationship between socio-economic status and performance (Figure II.4.9). The most extreme case was Peru, which had one of the highest levels of social segregation across schools – and was also one of the countries where the association between students’ socio-economic status and performance in PISA was one of the strongest amongst all PISA-participating countries and economies. By contrast, Canada, Croatia, Korea, Malta and Norway showed low levels of segregation, and the association between performance in PISA and socio-economic status was weak.

Figure II.4.9 **Equity in reading performance and no social diversity index**



**Notes:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3). The no social diversity index measures whether the diversity of students observed within schools reflects the diversity of students observed at the country/economy level. The index ranges from 0 to 1, with 0 corresponding to no segregation and 1 to full segregation (see Annex A3 for details).  
**Source:** OECD, PISA 2018 Database, Table II.B1.4.10.  
**StatLink** <https://doi.org/10.1787/888934037469>

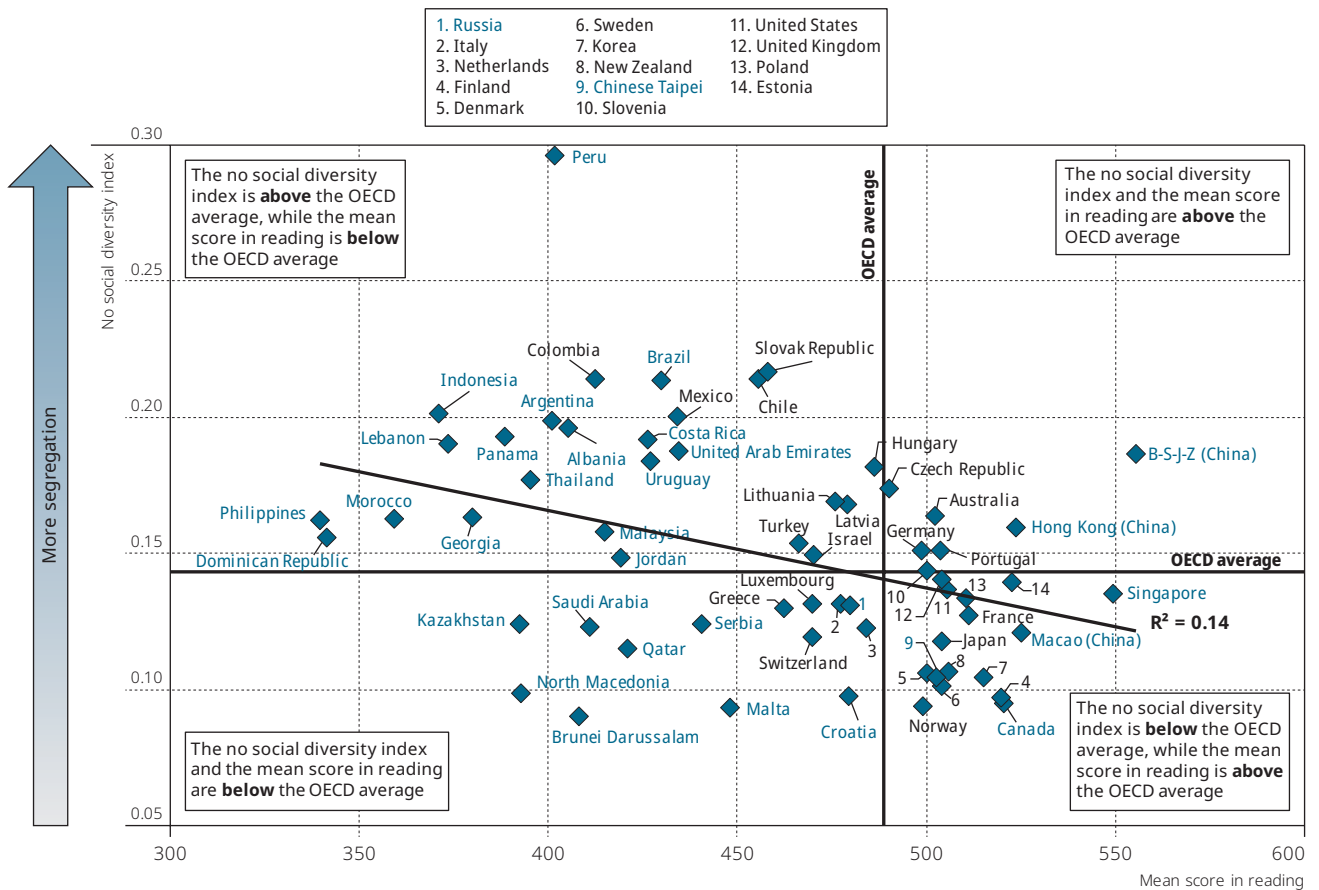




Previous analyses using data from successive cycles of PISA, from 2009 to 2015, also found a negative relationship between student sorting across schools and equity in education (OECD, 2019<sup>[1]</sup>). An increase in social segregation at the country level was related to a decrease in equity in learning outcomes, even when the specifics of the school system, such as tracking policies, were taken into account. However, the strength of the relationship was weak: the  $R^2$  value was only 0.25, meaning that the observed level of equity in education varied greatly amongst countries that show the same level of social segregation across schools.

PISA 2018 also found a negative, albeit weak (the  $R^2$  was only 0.14), relationship between average performance in reading and socio-economic segregation across schools (see Figure II.4.10). For instance, amongst those countries with reading performance higher than the OECD average, Australia, B-S-J-Z (China), the Czech Republic, Germany, Hong Kong (China) and Portugal showed less diversity across schools than the OECD average, while Denmark, Finland, Japan, Macao (China), New Zealand, Sweden and Chinese Taipei showed greater diversity.<sup>18</sup>

Figure II.4.10 Reading performance and no social diversity index



**Notes:** In this chapter, all analyses are restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3). The no social diversity index measures whether the diversity of students observed within schools reflects the diversity of students observed at the country/economy level. The index ranges from 0 to 1, with 0 corresponding to no segregation and 1 to full segregation (see Annex A3 for details).

**Source:** OECD, PISA 2018 Database, Tables II.B1.4.1 and II.B1.4.10.

**StatLink** <https://doi.org/10.1787/888934037488>

1. In addition, the social composition of schools may, in turn, influence a family's choice of where to live, meaning that residential and school segregation are mutually reinforcing (Epple and Romano, 2000<sub>[28]</sub>).
2. An exception is Antecol, Eren and Ozbeklik, (2016<sub>[29]</sub>) who, using experimental data on primary disadvantaged schools in the United States, observed that the proportion of low achievers in school had a significant positive effect on the reading performance of the other low achievers (and no significant impact on the reading performance of other students), and a significant positive impact on the mathematics performance of middle and top achievers.
3. This is illustrated, for instance, in the results obtained by comparing the achievement of students just below or just above a threshold of admissions in Boston and New York high schools (Abdulkadiroğlu, Angrist and Pathak, 2014<sub>[30]</sub>). The achievement outcomes of those who had attended these so-called “elite” schools did not differ from those who just failed the entrance exam. Similar results have also been observed by Dobbie and Fryer, (2014<sub>[31]</sub>) and in Kenyan high schools by Lucas and Mbiti, (2014<sub>[31]</sub>). The validity of this result may depend on the type of student studied. For instance, recent evidence on “gifted students” in US primary schools suggests that being tracked with other high-ability students has a positive impact on achievement only for minority students, without any significant impact on achievement for white students (Card and Giuliano, 2016<sub>[32]</sub>).
4. The “modal ISCED level” is defined here as the level attended by at least one-third of the PISA sample. In Albania, Argentina, Baku (Azerbaijan), Belarus, B-S-J-Z (China), Colombia, Costa Rica, the Czech Republic, the Dominican Republic, Indonesia, Ireland, Kazakhstan, Luxembourg, Macao (China), Morocco, the Slovak Republic, Chinese Taipei and Uruguay, both lower secondary (ISCED level 2) and upper secondary (ISCED level 3) schools meet this definition. In all other countries, analyses are restricted to either lower secondary or upper secondary schools (see Table II.C.1 in Annex C for details). In several countries, lower and upper secondary education are provided in the same school. As the restriction is made at the school level, some students from a grade other than the modal grade in the country may also be used in the analysis.
5. In Portugal, only 88.5% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.1); therefore, comparisons should be interpreted with caution.
6. In Lebanon, only 80.2% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.2); therefore, comparisons should be interpreted with caution.
7. In general, between-school variability was lower in school systems where the modal grade corresponded to lower secondary education (ISCED 2), which may be related to the fact that sorting by ability is more prevalent in upper secondary than lower secondary schools (OECD, 2019<sub>[11]</sub>). But amongst the countries with the lowest between-school variations, the modal grade in Canada and Portugal is ISCED 3 while amongst those with the highest school variations, the modal grade in Germany and the Netherlands is ISCED 2 (see Annex C).
8. The precise calculation when the value of the index is 0.30 is  $(0.30-1)*3/4-1 = 0.47$  for the probability of a typical student of one group interacting with another student of the same group. In the absence of any clustering, the index is 0 and this probability corresponds to the proportion of students of this group, 0.25 here. See Annex A3 for details.
9. In Brazil, only 82.7% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.2); therefore, comparisons should be interpreted with caution.
10. In Saudi Arabia, only 81% and in France, only 85% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.2); therefore, comparisons should be interpreted with caution.
11. For instance, recent evidence from experimental data in Indian schools suggests that having classmates from low-income families may make wealthier students more prosocial, generous and egalitarian, and less likely to discriminate against poor students, and more willing to socialise with them (Rao, 2019<sub>[33]</sub>).
12. The calculation is given by  $(1-0.67)/2 = 0.165$ ; see Annex A3 for details.
13. In Kosovo, only 75.6% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.7); therefore, comparisons should be interpreted with caution.
14. In Kosovo, Mexico and Switzerland, less than 80% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.3); therefore, comparisons should be interpreted with caution.
15. In Korea, only 83.6% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.10); therefore, comparisons should be interpreted with caution.
16. Formally  $H = H^{Priv/Pub} + \theta^{Public} H^{Public} + \theta^{Private} H^{Private}$  with  $H^{Priv/Pub}$  is the no social diversity index, measured by comparing the populations of 15-year-old students in private and public schools (taken as only two big entities);  $H^{Public}$  and  $H^{Private}$  the no social diversity indices estimated amongst public and private schools, respectively;  $\theta^{Private}$  and  $\theta^{Public}$  the proportion of 15-year-old students in public and private schools.
17. In Lebanon, only 56.8%, in Qatar, only 84% and in Portugal, only 82.8% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.11); therefore, comparisons should be interpreted with caution.
18. Similar conclusions hold when analysing academic segregation and education outcomes at the system level (see online Figures II.4.13 and II.4.14). The relationship between the index of isolation of high performers with both reading performance and equity in education were negative but weak (the  $R^2 = 0.17$  for average performance and  $R^2 = 0.13$  for the strength of the socio-economic gradient).



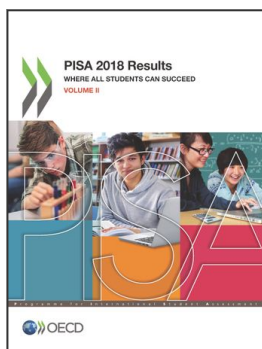
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